

Executive Committee of the Warsaw International Mechanism for
Loss and Damage associated with Climate Change Impacts

United Nations Framework Convention on Climate Change (UNFCCC)

Technical Meeting
Action Area 6: Migration, Displacement and
Human Mobility



Study Tour – Preparatory Note

Date: 29 July 2016

Casablanca, Kingdom of Morocco

[HTTPS://ENVIRONMENTALMIGRATION.IOM.INT/TECHNICAL-MEETING](https://environmentalmigration.iom.int/technical-meeting)

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Objectives of the Study Tour

The Study Tour will provide the opportunity for participants to concretely observe the impacts of climate change on the movement of people in urban settings at the local level. Participants will be able to build on this experience to reflect on the challenges and opportunities associated with migration, displacement and human mobility.

Background Information

The latest census conducted by the High Commission for Planning (HCP) of the Kingdom of Morocco estimates that the total population of the economic capital of Morocco, Casablanca, is approximately 3.4 million people. The total population of Greater Casablanca¹ exceeds 4.2 million inhabitants. The city is located along the Atlantic Ocean, on the plains of the Chaouia, on the western central part of the country.

Like other major cities on the southern shore of the Mediterranean, **Casablanca is faced with increasing occurrences of natural disasters in recent decades, mainly floods, submersion and coastal flooding.** According to the World Bank, the annual average number of disasters rose from 3 in 1980 to more than 15 in 2006.² In parallel, Casablanca is also vulnerable to slow onset environmental degradation such as coastal erosion. Moreover, Casablanca is increasingly subjected to the strong pressures of rapid urban growth³.

Two factors increase the vulnerability of the city to floods and other natural disasters:

- **Climate change** increases the frequency and intensity of extreme weather events
- **Rapid urban and demographic growth** (mainly growth linked to internal migration) increases the potential for loss and damage⁴ linked to climate change impacts.

Les risques urbains augmentent dans toutes les localités urbaines examinées

Risques	Alexandrie		Tunis		Casablanca		Vallée du Bouregreg	
	Actuel	2030	Actuel	2030	Actuel	2030	Actuel	2030
Séismes/instabilité des sols	Jaune	Jaune	Jaune	Orange	Jaune	Jaune	Jaune	Jaune
Tsunamis/submersion marine	Jaune	Orange	Jaune	Orange	Jaune	Jaune	Jaune	Orange
Érosion côtière	Jaune	Orange	Jaune	Orange	Orange	Orange	Jaune	Jaune
Inondations	Jaune	Jaune	Orange	Orange	Orange	Orange	Jaune	Orange
Pénurie d'eau	Jaune	Orange	Jaune	Jaune	Jaune	Jaune	Jaune	Jaune

■ Très élevé
 ■ Élevé
 ■ Moyen
 ■ Faible
 ■ Très faible

¹ Before the territorial division of 2015, the Greater Casablanca was one of the sixteen regions of Morocco. Located northwest of the country, the region consisted of two prefectures (Casablanca and Mohammedia) and two provinces (Nouaceur and Mediouna). The Greater Casablanca (including Casablanca's municipality) is now part of the Casablanca-Settat region. This Preparatory Note study is based on information collected prior to 2015.

² *Les villes côtières d'Afrique du Nord confrontent les désastres naturels et le changement climatique*, Banque Mondiale et Centre de Marseille pour l'Intégration en Méditerranée (CMI), 2011 : http://www.urbanknowledge.org/docs/coastal_cities.pdf

³ *Lbid*, p.1

⁴ *Lbid*, p.1

Natural Hazards and Disasters

According to the statistics published by the World Bank, the **risks of tsunamis and coastal submersion** within the Casablanca region were estimated to be average in 2010.⁵

Following an in-depth research of relatively recent tsunamis and offshore swells events, an average level of risk was maintained for 2030. Mohammedia (20 km north of Casablanca) is particularly concerned, as seawater spreads inside the city during stormy days.



Big waves on the coast of Casablanca - 7th June 2014

Additionally, the Lloyd's City Risk Index 2015-2025 estimates that floods linked to climate may generate losses that could **reach up to \$ 650 million in Casablanca**.⁶

Casablanca already **encounters frequent flooding**, mainly related to periodical heavy rainfalls, which can cause flash floods, in particular in the Wadi Bouskoura.⁷ On 30 November 2010, a record level of 18 cm was reached in a single night, the equivalent of six months of rainfall in normal times.⁸ The floods have repeatedly forced the closing of the international airport and of several businesses and schools across the city.



The main road from Casablanca-Rabat immersed in water during floods on 23rd March 2016

⁵ *Lbid*, p.13

⁶ http://www.lloyds.com/cityriskindex/locations/fact_sheet/casablanca

⁷ *Lbid*, p.12

⁸ *Lbid*, p.2

⁹ <http://www.medias24.com/SOCIETE/162685-Inondations-a-Casablanca-les-explications-de-Lydec.html>

Slow Environmental Degradation

A ten kilometers long coastal strip from the eastern end of Mohammedia to Casablanca is currently facing a high risk of **submersion and coastal erosion**. In addition to being one of the most important industrial areas in Morocco, that area is also densely populated and a strategic transport hub (railways, maritime transports, roads).

Current previsions related to the rise in sea level point to an increase in the vulnerability of the area in the upcoming years, notably due to coastal erosion threats.¹⁰ According to another study carried out by the World Bank, a 20 cm rise in sea level in Casablanca can be expected by 2030, which would lead to a loss of 10 to 15 m of the coastlines.¹¹ In a 1.5 ° C global warming scenario, 6% of the population would be located under the sea level; this figure would reach 14 % in a global warming scenario of 4 ° C¹². Both previsions would lead to major mobility impacts for inhabitants, who would likely be unable to remain in their current location.

The city also faces a medium risk of **water shortages** by 2030¹³, mainly due to industrial and population growth, but also linked to lower rainfall levels expected in Morocco. A major reduction in water resources might potentially lead to water stress issues, which can in turn also impact the mobility of people.

Risk Management Strategies

Since 2009, the effectiveness of Morocco's Disaster Risk Management strategy has increased as a result of the restructuration of the general Directorate for Civil Protection and the new Monitoring and Coordination Committee. Improved disaster vigilance and greater accuracy of previsions provided by the Department of Meteorology allowed Morocco to respond more effectively to heavy rainfall and flood occurrence.

However, despite the joint efforts of the government and the company for sanitation, drinking water and electricity (Lydec),¹⁴ the city experiences repeated flooding. In Wadi Bouskoura for instance, floods greatly affect inhabitants, especially as constructions of dwellings expand in the riverbed. Residential areas on the waterfront (Aïn Sebaa, Port, Marina, Avenue Royale, Nouvelle Corniche, El Ank, Sidi Abderrahmane) are also increasingly threatened by floods, thus pushing people to move as a direct result of climate change.

In order to ensure people's safety, the construction of a 3-km canal and an underground tunnel of 6.2 km has started, to allow to dump surplus water in the sea on the southern part of the city. However, this work

¹⁰ *Lbid*, p.13

¹¹ *Lbid*, p. 18

¹² « Le Maroc face au changement climatique Incidences sur la trajectoire de développement et perspectives d'adaptation », 2011, p. 10

¹³ «Les villes côtières d'Afrique du Nord confrontent les désastres naturels et le changement climatique », 2011, p. 14

¹⁴ Lydec belongs to the Veolia group, a private operator of public services that manages the distribution of water and electricity, the collection of wastewater and rainwater and street lighting for the 4.2 million inhabitants of the Greater Casablanca region.

will not be completed before 2017.¹⁵ Furthermore, a storm tank project with a capacity of 160,000 m³ is also under way; the tank is expected to hold water during rainfall.¹⁶

Planned Activities

- Meeting with the Technical Department (Risk Management Division) of the Casablanca municipality and/or of Wilaya
- Meeting with l'Heure Joyeuse¹⁷, an NGO fighting against social and professional exclusion and supporting migrants
- Bus tour of coastal areas at risk and areas most vulnerable to floods

For more information please consult the following resources:

General information on climate and environmental migration in Morocco: **Policy Brief Series Issue 3 | Vol. 2: Environmental migration in Morocco: Stocktaking, challenges and opportunities** in French and English

<https://environmentalmigration.iom.int/policy-brief-series-issue-3-vol-2>



Videos on coastal immersion in Casablanca

<https://www.youtube.com/watch?v=zAhTFvwNYSA>

<https://www.youtube.com/watch?v=UsIWAP5Euns>

<https://www.youtube.com/watch?v=zsk7WYG6yuo>

Videos on floods in Casablanca

<https://www.youtube.com/watch?v=1xmVgTuoc44>

<https://www.youtube.com/watch?v=kOjNBobxcAY>

<https://www.youtube.com/watch?v=W4ntjiInNDk>

Reports by local media

<http://www.medias24.com/SOCIETE/8007-Le-Maroc-est-bien-expose-a-un-risque-de-tsunami.html>

http://www.huffpostmaghreb.com/2015/11/11/tsunami-maroc_n_8530386.html

¹⁵ <http://www.maghress.com/fr/marochebdo/108988>

¹⁶ <http://aujourd'hui.ma/societe/autoroute-casablanca-un-bassin-dorage-pour-prevenir-les-inondations>

¹⁷ <http://www.heurejoyeuse.ma/fr/>